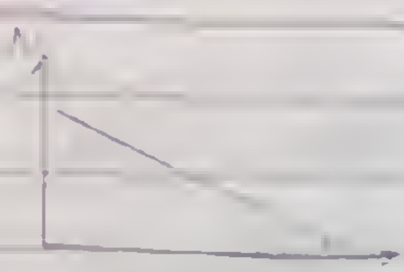
Current

Drift



L ← متغير طبقا للطول

$$I_n = q D_n \frac{N}{L}$$

طول الانتشار

Diffusion

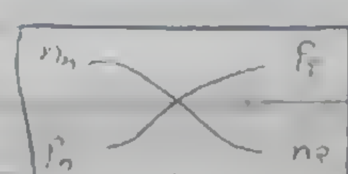
$$I \propto \frac{dn}{dt}$$

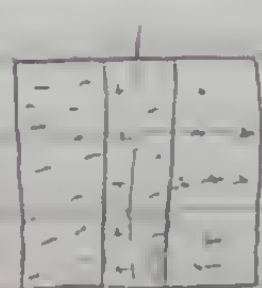
$$I_n = q A D_n \frac{dn}{dx}$$

$$I_p = q A D_p \frac{dp}{dx}$$

$$J_{tot} = q \left(D_n \frac{dn}{dx} - D_p \frac{dp}{dx} \right)$$

P_N Junction





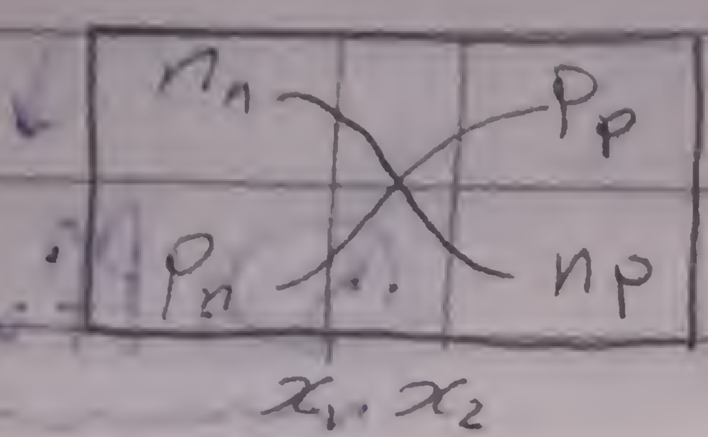
عند الوصول إلى حالة equilibrium :

$$I_{drift_p} = I_{diff_p}$$

$$\mu_p q A P E = q D_p \frac{dp}{dx}$$

$$-q \mu_p P \frac{dv}{dx} = q D_p \frac{dp}{dx}$$

Subject. Date.



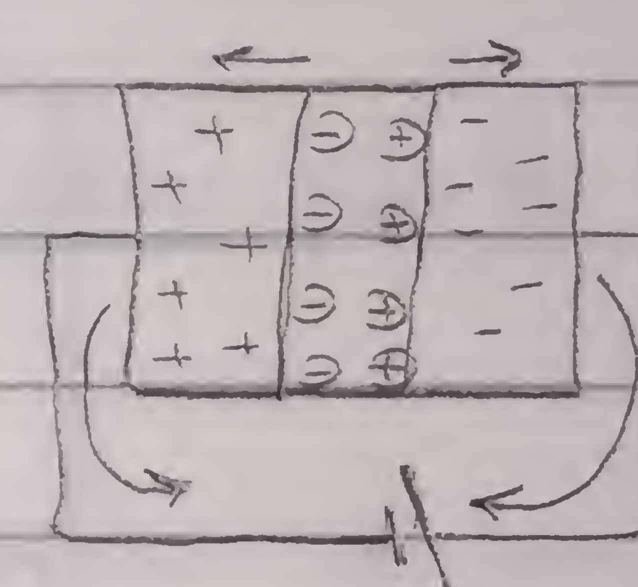
$$-\mu_p \int_{x_1}^{x_2} dv = D_p \int_{p_n}^{p_p} \frac{dp}{p}$$

$$V(x_2) - V(x_1) = \frac{-D_p}{\mu_p} \ln \frac{p_p}{p_n}$$

$$|V_0| = \frac{KT}{q} \ln \frac{p_p}{p_n}$$

اثبات هام ←

$$V_0 = \frac{KT}{q} \ln \frac{N_A N_D}{n_i^2}$$



$$C = \frac{\varepsilon A}{d}$$

$$V = Ed$$

$$C_J = \frac{C_{J0}}{\sqrt{1 + \frac{V_R}{V_0}}}$$

$$C_{J0} = \sqrt{\frac{\varepsilon_{si}\, q}{2} \frac{N_A N_D}{N_A + N_D} \frac{1}{V_0}}$$

هام جداً

$$C_J = C_{J0} \quad \text{at} \quad V_R = 0$$